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look like an equation in affected quadratics it loses much of its attractiveness to the ordinary botanist.

THE EDITORS OF THE GAZETTE propose to take a summer vacation, and to be relieved for a month or two from editorial duties. The August number will, therefore, not be published as usual, during the last week of July, but publication will be deferred to the last week of August, when a double number, of at least 30 pages. will be published for August and September. Any communications sent during the months of July and August should be addressed to the Editors at the Botanic Garden, Cambridge, Mass. We hope that subscribers will take careful note of the above, and not be sending us queries as to what has become of the August GAZETTE.

NOTULÆ EXIGUÆ.—*Eremurus robustus*, that stately Liliaceous plant of Turkestan, which is now displaying its raceme of half a yard in length in the Cambridge Botanic Garden, exhibits strong protandry correlated with a movement of the style, analogous to that of *Sabbatia*. When the flower opens the slender style becomes at once strongly deflexed; on the second or third day, when the stigma becomes receptive and the anthers effete, the style straightens and brings itself nearly into the line of the axis of the flower.

The collection of Venezuelan Mosses put up into sets of 145 species each, named by Dr. Mueller, with a printed form of ticket, along with a copy of the pamphlet (from Linnæa) in which they are enumerated, and the very many new species described, is now furnished for \$14, by Adolf Schrader, No. 224 West State St., Columbus, Ohio.—A. GRAY.

VITALITY OF SEROTINOUS CONES.—In a seed so large as any one of the Pines referred to, there need be no prolonged experiment to ascertain its vital power. All seeds change the normal color when the germinating power is lost. If a pine seed has an ivory white tint when cut across, it may grow, no matter how many years old it may be. I say may grow, because there are many contingencies on which success is dependent besides the vital conditions of the seeds themselves. Germinating pine seeds are susceptible to fungoid attacks beyond any seeds I know, and they are very often wholly destroyed before the radicle has hardly pushed through the seed coat. In Prof. Sargent's experiments the seed were sown on the 17th of May, and "the final examination was made on the 15th of December." The final examination should have been made within six weeks of sowing, as in *Pinus contorta*, all would have been sprouted in that time that intended to grow, and those with injured radicles would have been distinctly seen.

As the original discoverer of living trees of *Pinus pungens* in Pennsylvania (an old cone having been found by Professor Porter a few months before) I have taken an interest in watching its behavior. The cones would scarcely be called serotinous as a general thing, for I have often found cones of the same season open in October, and all

the seeds dispersed. But cones of many years old can be found on many trees, and though some have no seeds, others are full, and by cutting them across the seeds are found perfectly good. For commercial purposes when the new cones are not abundant enough, old cones are gathered for the seeds, and they grow just as well as the recently matured ones. I have known *Pinus pungens* six years cleaned to grow just as well as those taken from the cones, —and these cleaned seeds, too, made up from old closed cones, as well as from the fresher ones.

I have often been tempted to take up the pen, when scientific experiments have been recorded on the growth of seeds. Many of them are fallacious from assuming that seeds fail to grow to young plants for no other reason than that the seeds had lost their vital power. One may take a hundred of the freshest kind of Pine seeds, and another hundred of the same kind and sow in separate pots, and keep both under exactly the same conditions as far as he knows, and yet from the hidden causes I have referred to, have one hundred plants from one pot, and not fifty from the other. I feel quite sure that a serotinous Pine seed, if white and not yellowish when cut across, would grow just as well when twenty years old as any from recent cones.—T. M.

MICHIGAN LAKE SHORE PLANTS.—The following is a partial list of plants growing on the beach and sand banks of Lake Michigan in the vicinity of South Haven, Mich. :

Geranium Robertianum, L., grows sparingly on shady bluffs. *Ptelea trifoliata*, L., grows quite thriftily in clean white sand. *Ara-bis hirsuta*, Scop., is found on banks with heavy soil, and *A. lyrata*, L. abundantly in pure sand. The lyrate pinnatifid radical leaves of *A. lyrata* are generally entirely covered by the drifting sand, causing them soon to decay, thus making the plant difficult of analysis. The uppermost leaves are perfectly linear, and the whole plant often glaucous.

Prunus Virginiana L., *P. Pennsylvanica*, L., and *P. pumila*, L., are all found on sandy banks, the latter often ascending to a height of over four feet. *Potentilla Anserina*, L., grows on the level beach, its clumps of beautiful pinnate leaves, strongly resembling, at a short distance, a tuft of ferns. *Crataegus tomentosa*, L., var. *pyrifolia* occurs occasionally. *Lathyrus maritimus*, Bigelow, is plentiful in the sands all along the beach, making a fine display.

Diervilla trifida, Moench., occurs sparingly in the sand. *Cirsium Pitcheri*, Torr. and Gr., grows on sand bluffs. It is a singular plant, its very heavy heads resting on the ground.

Pyrrola chlorantha, Swartz., *P. secunda*, L., and *Chimaphila umbellata*, Nutt., occur on shaded bluffs. *Arctostaphylos Uva-ursi*, Spreng., I found on exposed, sandy banks.

Polygonum cilinode, Mx., is abundant in drifting sand. *Euphorbia polygonifolia*, L., is found on the level beach, also *Corispermum hyssopifolium*, L., but sparingly.